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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,314	02/13/2002	Kenji Hoshi	020171	4466
38834	7590	09/21/2004	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			FARAHANI, DANA	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 09/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/073,314

Applicant(s)

HOSHI ET AL.

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 13-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 13-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 13 and 14 are rejected under 35 U.S.C. 102(b) as being unpatentable over Kepler et al., hereinafter Kepler (U.S. Patent 6,037,671), previously cited.

In regard to claim 13, Kepler discloses in figure 3 alignment marks (the first one of the marks being the vertical lines at the most-top-right of the figure, and the immediate vertical lines below them; and the second alignment marks being the vertical lines at the most-top-left of the figure, and the immediate vertical lines below them) in a line space pattern along a first direction (vertical); and each of the plural lines being divided into a broken line having a plurality of segments (that is the vertical segments of the above described alignment marks), as can be seen in the figure.

In regard to claim 14, in Kepler, positions of the divisions between the plurality of segments of the lines are offset from those of the divisions between the plurality of segments of their adjacent lines.

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kepler in view of the Patent Application Publication (U.S. 2001/0019401), issued to Irie et al., hereinafter Irie, and further in view of Hwang et al., hereinafter Hwang (U.S. Patent 6,162,675), all previously cited.

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In regard to claim 1, Kepler discloses the limitations in the claim, as discussed above in regard to claim 13, but does not disclose the micronized pattern having a size smaller than a resolution limit of an alignment sensor.

Irie discloses in figure 1, and at pages 4 and 5, paragraph [0066], that a density filter [of light] has light blocking portions, shaped as dots, wherein the size of the dots becomes less than the resolution limit of an optical system in which the density filter is used. Furthermore, Irie discloses this structure results in higher light attenuation rate (see the above mentioned paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to introduce the micronized pattern of the Kepler reference, such that it would have a smaller size than a resolution limit of an alignment sensor in order to increase the light attenuation rate.

Kepler does not disclose the micronized pattern having a pattern-forming margin larger than that of a device pattern formed over the semiconductor wafer Hwang discloses in figure 15, a DRAM cell with a device pattern margin (that is the pattern of gates 206). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to make adjustments in alignment mark patterns in a particular masking situation to conform to the stepper used in the masking process. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CCPA 1955).

In regard to claim 2, the pattern in Kepler is a line and space pattern.

In regard to claims 3 and 4, in Kepler, each of lines constituting the line and space pattern is divided into a plurality of segments (see the explanation of claim 13 rejection, above).

4. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kepler, as applied to claim 13 above, and further in view of Hwang.

Kepler discloses the limitations in those claims, as discussed above, but does not expressly disclose a semiconductor device pattern is smaller than a margin of the alignment pattern. However, Kepler discloses at column 4, lines 41-45 that the dimensions of the marks are determined in a particular masking situation.

Hwang discloses in figure 15 a DRAM cell with a plurality of gates 206. It would have been obvious to one of ordinary skill in the art at the time of the invention to make adjustments in alignment mark patterns in a particular masking situation to conform to the stepper used in the masking process.

#### ***Response to Arguments***

5. Applicants arguments filed 6/23/04 have been fully considered but they are not persuasive.

Applicants argue that the previously cited reference, Madurawe, does not disclose the amended claim 13 limitations. However, in view of the newly added amendments, this reference is not being implemented in the above rejections. The primary reference discloses the limitations in claim 13, as discussed above.

Applicants further argue that the feature of micronized pattern having a size smaller than a resolution limit of an alignment sensor, and the feature of the micronized pattern having a pattern forming margin larger than a device pattern formed over the semiconductor wafer are not obvious over Kepler in view of the Irie reference. Nevertheless, it has been held that discovering

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an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In this case, the value of the size of the micronized pattern and the resolution limit of the sensor to influence the optical symmetry are the variables considered. Moreover, although the Irie reference is directed to light attenuation rate, the idea of the dots on a density filter correlating with the resolution limits of an optical system to affect the light attenuation rate is similar to the idea of the micronized pattern correlating with the resolution limit of the sensor, and this analogy of the two ideas is used to make the obviousness rejection. The structures of the two references are obviously different.

### *Conclusion*

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM, Est. time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M Fahmy can be reached on (571)272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

D. Farahani

LONG PHAM  
PRIMARY EXAMINER